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# Three New Species of *Piptocarpha* (Asteraceae: Vernonieae) from Ecuador and Peru

Harold Robinson

Botany, National Museum of Natural History, MRC-166, Smithsonian Institution, Box 37012, Washington, D.C. 20013-7012, U.S.A. Robinson.Harold@nmnh.si.edu

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**ABSTRACT.** *Piptocarpha geraldsmithii* H. Robinson, *P. klugii* G. Lom. Smith ex H. Robinson, and *P. vasquezii* H. Robinson are described as new from northern Peru and southern Ecuador. The first relates to an otherwise strictly Guyana Highland group of species, and the third has terminal panicles with uniquely formed urn-shaped heads.

**Key words:** Asteraceae, Ecuador, Peru, *Piptocarpha*, Vernonieae.

A series of collections of Asteraceae from northern Peru, recently sent for identification by the Missouri Botanical Garden, contained a number of undescribed species. Three of these species proved to be in one genus, *Piptocarpha* R. Brown, with one species, *P. klugii*, extending into southern Ecuador. The specimens could not be determined as any of the seven species of the genus recognized by Ger-

ald L. Smith in his treatment of the genus for Peru (Jones, 1980). The substantial addition to the number of species in Peru seems to justify the presentation of a new key to the ten species of *Piptocarpha* now known from the country.

The present study brings to almost 50 the number of species in the Neotropical Vernonian genus *Piptocarpha*. The genus is distributed from Central America and the West Indies to southeastern South America. Most species are scandent or scrambling with some shrubby species in southern Brazil. The habitats are montane temperate forests to savannas.

The species treated by Smith (Jones, 1980) as *P. sprucei* Baker is a synonym of *P. leprosa* (Lessing) Baker. One of the species validated here has proven to be the same as one included by Gerald Smith in his unpublished thesis work. It is validated here as a Smith species in order to complete the coverage of the Peruvian species.

## KEY TO THE SPECIES OF *PIPTOCARPHA* IN PERU AND ECUADOR

- 1a. Inflorescence a terminal branching panicle.
  - 2a. Heads ca. 8 mm high; inner involucre bracts not broadened distally, obtuse to shortly acute; abaxial surfaces of leaves discolorous, glands obscured by dense scales or hairs . . . . . *P. gutierrezii* Cuatrecasas
  - 2b. Heads ca. 10 mm high; inner involucre bracts broadened distally, apical margins broadly rounded; abaxial surfaces of leaves concolorous, without obvious hairs or scales, with obvious glandular dots . . . *P. vasquezii* H. Robinson, sp. nov.
- 1b. Inflorescence of heads clustered in glomerules or clumps in axils of full-sized leaves.
  - 3a. Stems strongly angular . . . . . *P. leprosa* (Lessing) Baker
  - 3b. Stems terete or nearly terete.
    - 4a. Heads with 9 to 35 florets.
      - 5a. Branches and undersurfaces of leaves with stalked stellate hairs . . . *P. asterotrichia* (Poeppig) Baker
      - 5b. Branches and undersurfaces of leaves densely covered with small fringed sessile scales.
        - 6a. Axillary groups of heads subumbellate with heads on stout short peduncles 4–8 mm long . . . . . *P. lechleri* (Schultz Bipontinus) Baker
        - 6b. Axillary groups of heads rather glomerulate with heads borne on short ramified branches and very short peduncles 1–2 mm long . . . . . *P. opaca* (Bentham) Baker
    - 4b. Heads with up to 7 florets.
      - 7a. Heads with 3 florets; basal appendages of anthers with blunt tips . . . *P. geraldsmithii* H. Robinson, sp. nov.
      - 7b. Heads with 6 or 7 florets; basal appendages of anthers with sharp points.
        - 8a. Pappus with slender bristles darkened toward tips; heads sessile in dense glomerules . . . . . *P. klugii* G. Lom. Smith ex H. Robinson, sp. nov.
        - 8b. Pappus white; heads with distinct peduncles or branched stalks.
          - 9a. Lower leaf surfaces with appressed hairs or scales; stems and branches with mostly appressed minute tomentum . . . . . *P. poeppigiana* (DC.) Baker
          - 9b. Lower leaf surfaces with stalked stellate hairs; stems and branches with short but coarse spreading fascicles of hairs . . . . . *P. canescens* Gleason



The four species presently known for Ecuador are all included in the above key, *Piptocarpha gutierrezii*, *P. lechleri*, *P. klugii*, and *P. poeppigiana*. The three new species of *Piptocarpha* are as follows. All three possess the extremely deciduous involucre bracts, nodes at the bases of the styles, and the indurated or sclerified tails of the anthers that are characteristic of the genus. All have the spinulose tricolporate type A pollen that is characteristic of the subtribe Piptocarphinae. All have corolla lobes coiling or curling backward at anthesis, a characteristic found in the Vernoniaeae most commonly in the subtribe Piptocarphinae.

***Piptocarpha geraldsmithii*** H. Robinson, sp. nov.

TYPE: Peru. Amazonas: Bagua Prov., Distrito Imaza, comunidad Aguaruna de Wanás, km 92 carretera Bagua–Imacita, Cherros Chinim, bordes quebrada rocosa, ambas márgenes, 700–800 m, 29 Aug. 1996, C. Díaz, Peña, Tsamajain & Roca 8065 (holotype, US; isotype, MO). Figure 1.

In habitu et in capitulis trifloribus et in caudis antherarum apice truncatis et in superficiebus adaxialibus foliorum reticulata prominule venulosis *P. auyantepuiensis* similis sed in caulibus rectioribus et in acheniis glabrioribus distincta.

Vines or scandent shrubs to 18 m high, with long, nearly straight, terete, brown stems and branches spreading at 90° angles, branches very slightly deflected at nodes, surfaces covered with many small fimbriate-margined scales, sparse or abraded on larger stems. Leaves alternate, petioles slender, 0.7–1.0 cm long; blades stiffly chartaceous, elliptical to broadly elliptical, 4.0–7.5 × 1.6–2.5 cm, base acute, margins entire, apex acute to slightly acuminate, extreme tip blunt, adaxial surface glabrous, alveolate with close reticulum of prominent veinlets, abaxial surface concolorous, sparsely lepidote with minute scales and with dark glandular punctations; venation pinnate, with 4 to 7 secondary veins on each side, spreading at ca. 60° angles. Inflorescences glomerulate, in axils of leaves, each cluster with 8 to 10 sessile heads. Heads ca. 1 cm high; involucre bracts ca. 15, imbricate in 4–5 series, ovate to narrowly elliptical, 1.5–5.0 × 1.0–1.5 mm, mostly glabrous abaxially, tomentellous at tip. Florets 3 in a head; corollas white, ca. 7 mm long, mostly glabrous, with few glandular dots on distal part of tube, tube ca. 4 mm long, narrow in basal 2 mm, broadened and funnelform in distal 2 mm, throat essentially lacking, with filaments inserted just below sinuses, lobes linear, 3.0–3.5 × 0.7–0.9 mm, anther thecae ca. 2.5 mm long, including basal tails ca. 0.7 mm long,

blunt at tip; apical appendage small, ca. 0.15 mm long and wide, glabrous. Achenes 3.5–4.0 mm long, mostly glabrous, with few hairs distally above sharpest 2 angles of achene; pappus white, 5.5–6.0 mm long, of ca. 60 bristles, slightly broadened distally, with outer series of shorter bristles 1–2 mm long. Pollen grains ca. 37 µm diam.

*Piptocarpha geraldsmithii* was provisionally identified as *P. opaca* (Benth.) Baker on the basis of the 1994 collection. True relationship is closer to two Venezuelan species, *P. auyantepuiensis* Aristeguieta (Steiermark, 1967) and *P. jauaensis* Aristeguieta & Steiermark (Steiermark & Brewer-Carias, 1976), endemic to the Guayana Highland region. The new species seems rather individually distinct from the two relatives by the comparatively straight stems. The related species are more deflected at the nodes, especially in the branches. The new species is more like *P. jauaensis* in the lack of numerous hairs at the top of the achene just below the callus and pappus. Hairs are present, however, restricted to the areas over the lateral achene margins, a situation that proves to be true of the type of *P. jauaensis* also, contrary to the original 1976 description. The new species is most like *P. auyantepuiensis* in the adaxial surfaces of the leaves with a close reticulum of prominent veinlets. The adaxial surface of the leaves of *P. jauaensis* has a more hardened and smooth appearance without prominent veinlets. Both *P. auyantepuiensis* and *P. jauaensis* are described with young stems densely covered with tomentose arachnoid hairs or arachnoid scales, but the type specimens show the same lepidote condition with margins of the scales shortly fimbriate as seen in the present new species. A note provided by Gerald Smith states that the species and its Venezuelan relatives are in *Piptocarpha* subg. *Hypericoides*.

The new species is named after Gerald L. Smith, student of the genus *Piptocarpha* who contributed the treatment cited here from Peru (Jones, 1980). Smith has published notes and new taxa in the genus in two additional papers (Smith, 1981, 1982). Unfortunately, the Smith dissertation on *Piptocarpha* remains unpublished.

*Paratype.* PERU. **Amazonas:** Distrito Imaza, Región Nororiental del Marañon, comunidad de Kampaenza, ribera de la quebrada Shimutaz, Río Marañon, 04°55'S, 78°19'W, 320 m, 24 Sep. 1994, N. Jaramillo, Apanu & Katip 498 (MO, US).

***Piptocarpha klugii*** G. Lom. Smith ex H. Robinson, sp. nov. TYPE: Peru. Loreto: Pumayacu, between Balsapuerto and Moyobamba, 600–1200 m, Aug.–Sep. 1933, Klug 3167 (holotype, GA; isotype, US).





Figure 1. *Piptocarpha geraldsmithii* H. Robinson, sp. nov. Holotype, Peru: Amazonas, Díaz et al. 8065 (US).



A speciebus pluribus in floribus ca. 7 in capitulo et in setis pappi fulvescentibus et in caudis antherarum argute acutis distincta.

Scandent shrubs or vines, with sparse branching at ca. 80° angles; stems brown, terete, with slight deflection at nodes on stems and branches, surfaces lepidote with small scales, sparse on larger stems, dense on branches. Leaves alternate, petioles 0.7–0.9 cm long; blades stiffly chartaceous, oblong-elliptical, mostly 6–13 × 2.0–4.5 cm, base acute, margins entire, apex short-acuminate with extreme tip narrowly obtuse, adaxial surface rather lustrous, with sparse minute scales, with elongate areolation formed by prominulous veinlets, abaxial surface either concolorous with sparse minute scales or pale with dense cover of scales; venation pinnate, with ca. 6 secondary veins on each side, spreading at ca. 75° angles, arching upward nearer margins. Inflorescences glomerulate in axils of leaves; clusters of ca. 20 heads on short branching stalks 2–3 mm long. Heads ca. 7 mm high; involucre bracts ca. 15, imbricated in 4–5 series, ovate to broadly oblong-elliptical, 1–4 × 1.5–2.0 mm, tips obtuse to rounded, glabrous abaxially, darkened toward tips. Florets ca. 7 in a head; corollas white or greenish white, 5.5–6.0 mm long, basal tube slender in basal 1.5–2.0 mm, broadened and funnellform in distal 1.5 mm, glabrous below, with scattered short-stalked capitate glands on distal part, throat essentially lacking, with filaments inserted just below sinuses, lobes linear, ca. 2.5 × ca. 0.7 mm; anther thecae 2.3–2.5 mm long, including pale sharply pointed basal tails ca. 0.5 mm long; apical appendage pale, ca. 0.7 mm long, broadly oblong-ovate, glabrous. Achenes ca. 3 mm long, glabrous, with 2 sharper lateral angles, with 3 weak costae outside, 2 inside; pappus ca. 5.5 mm long, of ca. 50 bristles, very slender and pale below, broadened and brownish distally, without an evident shorter outer series. Pollen grains ca. 37 µm diam.

*Piptocarpha klugii* is one of the Andean species with axillary clusters of heads, pointed anther tails, and the lepidote rather than stellate pubescence, but it is distinct by the slender pappus bristles that darken distally. Except for the pale and densely lepidote abaxial surfaces of the leaves of Díaz & Peña 8754, the four specimens included here are similar in every respect, and they are treated as conspecific.

At the time that the description was prepared, there was some suspicion the unpublished name *P. klugii* of Gerald Smith might apply. This has subsequently been confirmed by Smith, who agrees to have it validated here. The Smith name has pre-

viously been used on annotations and it appears in print as a nomen nudum in the *Catalogue of the Flowering Plants and Gymnosperms of Peru* (Brako & Zarruchi, 1993).

The habitat is consistently cited as primary forest. In one form it was cited from “bosque primario sobre pendientes de 30%, arboles cubiertos de musgos, suelos lentizoles.”

*Paratypes.* ECUADOR. **Morona-Santiago:** Gualaquiza Cantón, Cordillera del Cóndor, ridge top above Banderas, near disputed Ecuador–Peru border, 03°28'S, 78°15'W, 1350 m, 17 July 1993, A. Gentry 79959 (MO, US). PERU. **Amazonas:** Luya Prov., Camporeddondo, Tullanya, base Cerro Huicsocunga, La Laguna, 06°06'33"S, 78°20'55"W, 2080 m, 1 Dec. 1996, C. Díaz & Peña 8754 (MO, US) (form with leaves discolorous and densely lepidote below); Bagua Prov., Distrito Imaza, Tayu Mujaji, comunidad de Wawas, 05°15'25"S, 78°21'41"W, 800 m, 23 Oct. 1997, R. Rojas, Peña, Anag & Yagkuag 403 (MO, US).

***Piptocarpha vasquezii*** H. Robinson, sp. nov.  
TYPE: Peru, Amazonas: Bagua Prov., Distrito Imaza, comunidad de Yamayakat, 05°03'24"S, 78°20'17"W, 600 m, 9 July 1997, R. Vásquez, Peña & Chávez 23981 (holotype, US; isotype, MO). Figure 2.

A speciebus pluribus in inflorescentiis paniculatis et in capitulis majoribus urceolatis in bracteis interioribus apice late rotundatis et in appendicibus antherarum glanduliferis differt.

Coarse scandent shrubs or vines, with branches spreading at 55–75° angles; stems and branches brown, terete, closely shallowly striated, covered with dense granular pubescence of nearly sessile, peltately attached, shallowly stellately lobed cells. Leaves alternate, petioles 1–2 cm long; blades broadly elliptical to obovate, mostly 12–17 × 4–9 cm, base broadly acute, usually somewhat unequal, margins entire, apex shortly and sharply acuminate, surfaces concolorous, sparsely pitted or lepidote with minute scales or stellately lobed cells, adaxial surface shinier than abaxial surface; venation pinnate, with 8 or 9 secondary veins on each side, spreading at 65–75° angles. Inflorescences terminal panicles with paniculate branches, branchlets in corymbiform clusters of few heads; peduncles 2–6 mm long, with densely granular pubescence. Heads 10–11 mm high; involucre cylindrical below, slightly constricted distally, terminating with somewhat spreading expanded tips of longest bracts; bracts in ca. 7 imbricated series, ovate to oblong, 1.5–7.0 × 1.5–2.0 mm, with granular pubescence on lowest bracts and on distal dark areas of median bracts, inner longest bracts glabrous or nearly glabrous, castaneous, distally scarious with broadly rounded



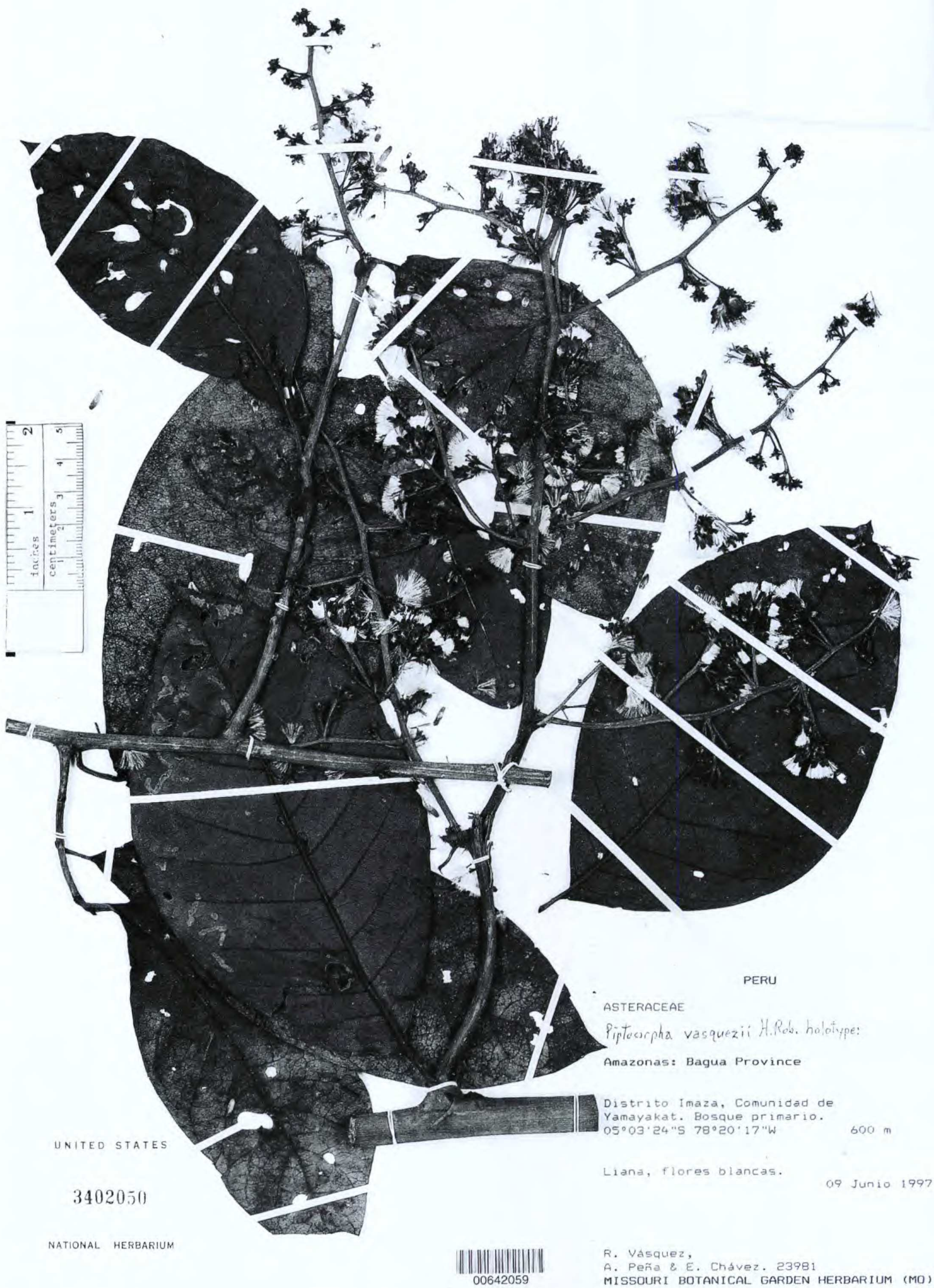


Figure 2. *Piptocarpha vasquezii* H. Robinson, sp. nov. Holotype, Peru: Amazonas, *Vásquez et al.* 23981 (US).



apices. Florets 6 or 7 in a head; corollas white, ca. 7 mm long, mostly glabrous, with few glandular dots on upper tube and toward tips of lobes, basal tube ca. 3.5 mm long, lower narrow part ca. 1.5 mm long, upper 2 mm broadened, funnelform, throat ca. 0.8 mm long, between insertion of stout filaments and sinuses, with many transverse undulations, lobes linear, ca. 3 mm long, 0.5 mm wide; anther thecae 3.3–3.5 mm long, including basal whitish, sclerified, sharply pointed tail ca. 0.5 mm long; apical appendages pale, triangular-ovate, ca. 0.5 mm long, with a number of stalked glands outside near base and middle. Achenes ca. 3 mm long, cylindrical when immature, becoming somewhat obcompressed, with many glandular dots when young; pappus white, ca. 6 mm long, with ca. 80 slender bristles, broadened distally, with outer series of some shorter bristles or narrow scales ca. 0.8 mm long. Pollen grains ca. 40  $\mu\text{m}$  diam.

*Piptocarpha vasquezii* is a remarkably distinctive new species presently known only from the two collections from primary forest in the Imaza District of Amazonas, Peru. The species belongs to the group with heads in terminal panicles, but the heads are much larger than other such species and the involucre bracts form a vase-like structure constricted above and then broadened apically with enlarged rounded tips on the longer bracts. The apical appendages of the anthers have a number of glands, a characteristic found in many members of the subtribe Vernoniinae, but very rare in the Piptocarphinae. Single glands have been seen previously on anther thecae beside apical appendages in one Venezuelan specimen of *Piptocarpha triflora* (Aublet) Bennett ex Baker (Wurdack & Adderley 43490, US).

A wider sample may show that the characteristic is more common. The new species is distinct among those named here by the insertion of the anther filaments ca. 0.8 mm below the bases of the corolla sinuses instead of immediately below the sinuses. The area between, the throat, has marked transverse undulations.

Gerald L. Smith has examined the type of the species and places it in *Piptocarpha* subg. *Oocephalus*.

*Paratype.* PERU. Bagua Prov., Distrito Imaza, Yamayakat, 05°03'20"S, 78°20'23"W, 350 m, 7 June 1996, R. Vásquez & A. Vásquez 21064 (MO, US).

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